# **BIOTIC COMMUNITY**

#### **Fish Community**

Fish community data were collected by Missouri Department of Conservation staff from 180 sites throughout the basin during 1995 - 1997 (Table 9). Fish were collected using a seine 15 or 25 feet long with 1/8" mesh. Kick seine methods were used to sample riffles. A boat-mounted electrofishing unit was used where possible to sample deep pools. Large fish were identified on site and returned to the water. Small fish were preserved and later identified in the lab. Data collected prior to 1995 were obtained from the Missouri Department of Conservation fish database.

A total of 80 species from 16 families has been collected in the Salt River basin. Sixty-four species and one *Lepomis* hybrid were found in recent surveys. From a basinwide perspective. the community includes fishes representative of the Prairie, Lowland, Ozark, and Big River faunal regions. Of recently collected species, one-third are wide-ranging, 13% are Big River species, 25% are Prairie species, 31% are Ozark species, and 9% are representative of the Lowlands (Pflieger 1971). Several species are often associated with two faunal regions so the sum of these percentages exceeds 100%. The dominant fish families were the minnows (17 species), perches (10 species), suckers (9 species), sunfishes (9 species) and catfishes (8 species). The most common and abundant species collected in recent surveys were the bluntnose minnow (Pimehpales notatus) and red shiner (Cyprinella lutrensis). Bluntnose minnows comprised 13 to 24% of the total fish sample in each of four main sub-basins (lower Salt, North Fork, Middle Fork, South Fork) and occurred at 85% of all sites. Red shiners comprised 14 to 41% of the total sample in each sub-basin and were found at 70% of all sites. Both species are tolerant of high turbidity and siltation that persists throughout much of the basin. Other commonly occurring species (found in at least 60% of all sites) include the following: johnny darter (Etheostoma nigrum), creek chub (Semotilus atromaculatus), redfin shiner (Lythrurus umbratilis), and green sunfish (Lepomis cyanellus).

Sportfish (18 species that provide angling opportunity) comprised 6% of all fish collected in basin streams. These fishes were under-represented numerically because larger adults were not fully vulnerable to our sampling gear. Green sunfish were the most abundant species in this group and were found at 68% of all sites. Channel catfish (*Ictalurus punctatus*), probably the most popular game species outside of Mark Twain Lake, were occurred at 12% of all sites, but accounted for less than 1% of the total fish collected. Largemouth bass (*Micropterus salmoides*) and bluegill (*Lepomis macrochirus*) were collected at 37 and 38% of all sample locations, respectively.

Sixteen species found in the basin prior to 1995 and not found in recent surveys include the following: lake sturgeon (*Acipenser fulvescens*), which were stocked in Mark Twain Lake and last collected in 1986, mooneye (*Hiodon tergisus*) and goldeye (*H. alosoides*) last collected in 1957, threadfin shad (*Dorosoma petenense*), which were stocked in Mark Twain Lake and last collected in 1989, highfin carpsucker (*Carpiodes velifer*) last collected in 1983, spotted sucker (*Minytrema melanops*) last collected in 1986, black redhorse (*Moxostoma duquesnei*) last

collected in 1978, goldfish (*Carassius auratus*) last collected in 1957, hornyhead chub (*Nocomis biguttatus*) last collected in 1941, silver chub (*Macrhybopsis storeriana*) last collected in 1983, pallid shiner (*Notropis amnis*) and river shiner (*N. blennius*) last collected in 1941, spotfin shiner (*Cyprinella spiloptera*) and striped shiner (*Luxilus chrysocephalus*) last collected in 1983, Mississippi silvery minnow (*Hybognathus nuchalis*) last found in 1957, and freckled madtom (*Noturus flavus*) last collected in 1978. Striped shiners, pallid shiners, hornyhead chubs, and Mississippi silvery minnows have likely been extirpated from the basin. Similar declines of these species have occurred in other northeast Missouri streams. Reasons for the declines are not well understood; however, these species prefer clear water and are intolerant of turbidity and siltation (Pflieger 1997). The only species collected in recent surveys that were not found prior to 1995 were paddlefish (*Polydon spathula*) and walleye (*Stizostedion vitreum*). Although not abundant, both species have been long time inhabitants of the basin due to its connection with the Mississippi River, but apparently avoided sampling gear during early surveys.

The lower Salt River sub-basin, which had the fewest sample sites, yielded the most species (58), followed by the Middle Fork (48), South Fork (43), and North Fork (41). We also found a higher average number of species per site in the lower Salt sub-basin than in other sub-basins. Thirty-three species were collected from one site in the lower Salt River just below the reregulation dam. This sub-basin, in which streams typically have higher gradients and largely gravel substrates, had proportionately more species associated with the Ozark and Big River faunal regions than the other sub-basins. The North Fork, Middle Fork, and South Fork sub-basins were generally dominated by more tolerant, Wide-Ranging species, although Ozarkian species were also common.

### **Threatened and Endangered Species**

Of the species collected in the basin since 1995, two (paddlefish, and ghost shiners, N. *buchanani*) are currently on the state watch list. None are considered state or federal rare or endangered. Although not found in the basin recently, lake sturgeon, which are state endangered, are likely to occur in the periodically in the lower Salt River due to past stockings in Mark Twain Lake and restoration efforts in the Mississippi River.

#### Fish Stockings

Several fish species have been stocked in basin streams and lakes. Spotted bass (*Micropterus punctulatus*) were stocked in basin streams 1961 in an attempt to provide an additional sportfish (Fajen 1975). Survival of these fish was very low. Other species have been stocked into Mark Twain Lake to improve the lake fishery. Walleye were stocked annually from 1984 to 1996. Survival of these walleye has been low. Adult walleye currently utilize gravel shoals in streams above Mark Twain Lake each spring for spawning. However, spawning success and survival of the hatch is apparently low. Small and advanced walleye fingerlings were stocked in several basin streams during 1999 and 2002 and the success of these stockings is under evaluation. Threadfin shad were stocked in Mark Twain Lake during 1986 and 1989 to provide an additional forage species for sportfish in the lake. Survival and reproduction of this species was determined to be insufficient to benefit sportfish survival and growth in the lake so stocking was discontinued. Blue catfish (*Ictalurus furcatus*) were also stocked in Mark Twain Lake, first in

1984 and later in 1992. Lake sturgeon (*Acipenser fulvescens*) were stocked in Mark Twain Lake in 1986 and 2001 as part of Missouri's reintroduction program. Fishes stocked in rearing ponds within the basin of Mark Twain Lake prior to impoundment include largemouth bass (*M. salmoides*), bluegill, channel catfish (*I. punctatus*), black crappie (*Pomoxis nigromaculatus*), orange spotted sunfish (*L. humilis*), gizzard shad (*D. cepedianum*), and fathead minnows (*Pimephales promelas*).

## **Aquatic Invertebrates**

Benthic marcoinvertebrate surveys in the basin have been conducted by the Missouri Department of Conservation (Duchrow 1974), Hazelwood (1974-1981), Missouri Botanical Gardens (Klein and Daley 1974), Gass (1979), and Environmental Science and Engineering, Inc. (Govro 1984). The first four studies documented the presence of 298 benthic macroinvertebrate taxa. The most recent survey (Govro 1984) reported 96 taxa. Duchrow (1974) reported that the communities in the Salt River basin were dominated by silt-tolerant forms due to heavy siltation and turbidity from agricultural practices that have degraded the habitat to the point that communities characteristic of undisturbed streams cannot be supported.

Govro (1984) also reported twenty mussel species in the upper Salt basin. The most abundant were three-ridge (*Amblema plicata*) and fat mucket (*Lampsilis radiata luteola*). Only fossil shells of *Quadrula pustulosa*, *Elliptio dilatata*, *Strophitus undulatus*, *Lampsilis teres*, *Ligumia subrostrata*, and *Obliquaria reflexa* were collected. The Salt River was once one of two Missouri streams where the state endangered Warty-back (*Quadrula nodulata*) occurred. However, it was likely extirpated from the basin following inundation of Mark Twain Lake. The Missouri of Department of Conservation mussel database list 43 species in streams of the basin (Table 10).

Five crayfish species are known to inhabit basin streams or grasslands (B. DiStifano, Missouri Department of Conservation, personal communication). These species are as follows:

Golden Crayfish (*Orconectes luteus*)-common Missouri crayfish Northern crayfish (*Orconectes virilis*)-most widely distributed of Missouri crayfish Papershell crayfish (*Orconectes immunis*)-common to Prairie and Big River faunal regions

Devil crayfish (*Cambarus diogenes*)-burrowing species common in northern Missouri Grassland crayfish (*Procambarus gracilis*)-burrowing species inhabiting grasslands, often away from water

Table 9. Fish species collected and current status in the Salt River basin.

Common Name	Collected Prior to 1995	Collected 1995-2000	Current Status*
Paddlefish		X	U
Lake sturgeon	X		R
Shortnose gar	X	X	LA
Longnose gar	X	X	LA
Mooneye	X		R
Goldeye	X		U
Gizzard shad	X	X	LA
Threadfin shad	X		Е
Bigmouth buffalo	X	X	LA
Black buffalo	X	X	R
Smallmouth buffalo	X	X	LA
Quillback	X	X	С
River carpsucker	X	X	С
Highfin carpsucker	X		R
White sucker	X	X	LA
Northern hogsucker	X	X	U
Spotted sucker	X		R
Black redhorse	X		R
Golden redhorse	X	X	С
Silver redhorse	X	X	R
Shorthead redhorse	X	X	LA
Common carp	X	X	С
Goldfish	X		U
Hornyhead chub	X		Е
Silver chub	X		U
Gravel chub	X	X	U
Creek chub	X	X	С
Southern redbelly dace	X	X	LA
Bigeye shiner	X	X	LA
Bigmouth shiner	X	X	С
Emerald shiner	X	X	LA
Ghost shiner	X	X	U
Golden shiner	X	X	С
Pallid shiner	X		Е
Red shiner	X	X	С
Redfin shiner	X	X	С
River shiner	X		U
Sand shiner	X	X	С
Spotfin shiner	X	X	С
Striped shiner	X		Е

Table 9 continued

Bluntnose minnow	X	X	С
Bullhead minnow	X	X	C
Mississippi silvery minnow	X		Е
Fathead minnow	X	X	С
Suckermouth minnow	X	X	LA
Central stoneroller	X	X	С
Channel catfish	X	X	С
Blue catfish	X	X	U
Black bullhead	X	X	LA
Yellow bullhead	X	X	LA
Flathead catfish	X	X	С
Stonecat	X	X	С
Tadpole madtom	X	X	R
Freckled madtom	X		R
Slender madtom	X	X	С
American eel	X	X	U
Blackstripe topminnow	X	X	С
Mosquitofish	X	X	U
White bass	X	X	LA
Sauger	X	X	U
Walleye		X	LA
Blackside darter	X	X	LA
Slenderhead darter	X	X	С
Logperch	X	X	LA
Western sand darter	X	X	R
Johnny darter	X	X	С
Bluntnose darter	X	X	R
Orangethroat darter	X	X	С
Fantail darter	X	X	U
Spotted bass	X	X	R
Smallmouth bass	X	X	U
Large mouth bass	X	X	С
Green sunfish	X	X	С
Orangespotted sunfish	X	X	С
Bluegill	X	X	С
Rock bass	X	X	R
Black crappie	X	X	U
White crappie	X	X	LA
Brook silverside	X	X	LA
Freshwater drum	X	X	LA
hybrid sunfish	X	X	R

<sup>1-</sup>C=common, E=extirpated, LA=locally abundant, R=rare, U=uncommon

Table 10. Mussel species collected from streams in the Salt River basin, 1977-1986 (Missouri Department of Conservation, S. Bruenderman, personal communication).

Species	Species
Paper floater	Flat floater
Giant floater	Cylindrical papershell
Squawfoot	Rock pocketbook
White heelsplitter	Fluted shell
Washboard	Pistolgrip
Mapleleaf	Wartyback
Pimpleback	Rabbit's foot
Monkeyface	Wabash pigtoe
Purple pimpleback	Round pigtoe
Ladyfinger	Pondhorn
Threehorn wartyback	Mucket
Ellipse	Butterfly
Fawnsfoot	Deertoe
Fragile papershell	Pink heelsplitter
Purpleshell	Pink papershell
Liliput shell	Black sandshell
Pondmussel	Yellow sandshell
Pink mucket	Pocketbook
Britt's mussel	Eastern lampmussel